

May 26, 2017



Mr. Matthew Morris  
Washington State Department of Ecology  
Southwest Regional Office Toxics Cleanup Program  
PO Box 47775  
Olympia, Washington 98504-7775

*Subject:*   **Supplemental Remedial Investigation Work Plan**  
              **Former Standard Oil Bulk Terminal/Chevron Facility No. 1001348**  
              1656 East J Street  
              Tacoma, Washington

Dear Mr. Morris:

On behalf of Chevron Environmental Management Company (Chevron EMC), Leidos, Inc. (Leidos) prepared this work plan to perform a supplemental remedial investigation (RI) at the Former Standard Oil Bulk Terminal/Chevron Facility No. 1001348 located at 1656 East J Street in Tacoma, Washington (Figure 1), herein referred to as the "Site." The former bulk terminal is under an Agreed Order (No. DE 7111) with the Washington State Department of Ecology (Ecology). This work plan is an addendum to the *Remedial Investigation Work Plan* dated June 4, 2010 and is a response to comments provided by Ecology on January 8, 2015 and February 22, 2016 to the *Draft Remedial Investigation Report* and July 21, 2016 to the *Draft Supplemental Remedial Investigation Work Plan*.

The investigation activities proposed by this work plan will be performed per the requirements of Agreed Order No. DE 7111, and are consistent with the *Remedial Investigation Work Plan* dated June 4, 2010 as well as the *Remedial Investigation Sampling and Analysis Plan* dated May 25, 2010 and the *Remedial Investigation Quality Assurance Project Plan* dated May 25, 2010.

## **SITE DESCRIPTION**

The fenced 3.5-acre former Standard Oil bulk terminal is located in an industrial area at in Tacoma, Washington (Figure 1). The former bulk terminal was in operation from 1905 to 1988. A summary of the regional geology, hydrogeology, and a complete summary of the site background, including investigative history were presented in

SAIC's *Remedial Investigation Work Plan* dated June 4, 2010 as well as the *Draft Remedial Investigation* dated December 15, 2014.

The property is currently used for transportation offices, parking for transportation vehicles, and employee parking for the adjacent Northwest Detention Center. Three buildings are present on the property. The building in the center of the property is a tent hangar structure that is currently used for storage. The building located adjacent to East J Street is used for office space and is built on a four-foot thick concrete slab. The office concrete slab appears to be in good condition with no cracking. No utilities run through the slab (all are either routed from overhead or along the outside of the slab) therefore are no pathways for vapors to enter this building. A third building, also along East J Street, consists of a mobile office trailer, with no foundation.

A review of the City of Tacoma utility database indicates subsurface utilities near the site are limited to sanitary and storm sewer lines running south to north beneath East J Street. These lines are at an elevation of approximately 0.6 ft well below the groundwater elevation of MW-10 (6-7 ft). As explained below the proposed monitoring well along East J Street will serve to evaluate any impacts flowing along this utility corridor.

### **TIDAL INFLUENCE STUDY**

As detailed in the *Tidal Influence Study Work Plan* a tidal study was performed in order to identify the relationship of the site-wide groundwater gradient and seawater intrusion to the tidal cycle in Commencement Bay.

Water level measurements were taken in deep wells D-1, D2A, D-3, D-6 and D-7 and shallow monitoring wells MW-10, MW-14, MW-18, MW-19, MW-21 and MW-22 once per hour from September 1 through September 29, 2016. Measurements were taken automatically using pressure transducers and electronic data loggers calibrated manually by an electric water-level meter. Tidal height information was obtained from NOAA using predictions corrected for Tacoma, Washington.

Potentiometric maps depicting the shallow upper aquifer at low and high tide conditions are presented as Figures 1 and 2. The data collected during this study indicate that the shallow aquifer gradient is towards the north-northwest.

The lower aquifer groundwater flow directions at high and low tide conditions are shown on Figures 3 and 4. These potentiometric maps show that at high tide conditions the gradient shifts to the north-northwest. At low tide conditions the gradient is to the north-northeast towards the Wheeler-Osgood Waterway.

A detailed presentation of the tidal influence of site-wide groundwater will be presented in the Remedial Investigation Report to be completed following this supplemental RI filed work. The data collected on groundwater gradient was used to adjust locations of proposed downgradient monitoring wells to fully delineate the groundwater impacts on the Site.

## **MONITORING WELL LOCATION AND ELEVATION SURVEY (EXISTING WELLS)**

A Washington State licensed land- surveying firm was subcontracted to perform a location and elevation survey of the existing monitoring wells. Monitoring well elevation measurements were made to the nearest 0.01 foot at the ground surface (top of well-box lid) and at the top of the well casing relative to 1988 North American Vertical Datum (NAVD88). These data were used in conjunction with the groundwater data to produce Figure 1 through 4 depicting gradients and direction of groundwater during high and low tidal conditions.

## **PROPOSED ACTIVITIES**

Ecology has directed Chevron to complete additional soil and groundwater to complete the RI. To address Ecology comments approximately 18 soil borings and an additional 14 monitoring wells (D-8 through D-14, and MW-22 through MW-28). Proposed locations for the soil borings and monitoring wells are shown on Figures 4 and 5. Justification for the sample locations are provided below:

- Soil borings OB-1 through OB-5 will be installed along East F Street just north of the former bulk terminal property. These borings will be installed to delineate soil impacts north of SB-36, SB-55, and SB-60;
- Soil borings OB-6 through OB-9 will be installed west of the property on Burlington Northern Santa Fe (BNSF) Railway property to delineate soil impacts west of SB-57 and SB-59;
- Proposed soil borings OB-10 through OB-12 will be placed off property to the south of the subject property. These soil borings are south of previously installed soil borings SB-29, SB-50, and SB-58 and will be placed on property owned by BNSF;
- Soil borings SB-72 through SB-74 will be installed on the eastern side of the former bulk terminal property and will capture any soil impacts east of SB-33, SB-16, SB-53, and SB-54;
- Proposed soil borings SB-75 through SB-78 will be installed in the central portion of the subject property to refine the extent of petroleum impacts surrounding monitoring well MW-20;
- Monitoring wells D-8 and MW-23 will be installed in the City of Tacoma right-of-way northwest of the property. Monitoring well D-8 will be installed in the deep aquifer and monitoring well MW-23 will be screened in the shallow aquifer at a distance from D-8 that conforms with WAC 173-160 Minimum Standards for Construction and Maintenance of Wells;
- Monitoring wells MW-24 and D-9 will be installed in the City of Tacoma Right of way northeast of the former terminal along the parking strip of East J Street. These wells will provide a downgradient data point for the shallow and deep aquifers as well as detecting any impacts that may have migrated through the storm sewer corridor in J Street;

- Monitoring wells MW-25 and D-10 will be installed on the Steeler property (west of MW-13);
- MW-26 will be installed east of MW-10;
- MW-27, MW-28 and D-11 will be installed on BNSF property upgradient from the property;
- D-13 will be installed on the property near the office building;
- MW-29 and D-15 will be installed on the Rainer plywood (north of D-6 and MW-18);
- Monitoring well D-14 will be installed on-property downgradient of MW-20. D-14 will be installed using a sonic drill rig and screened from 25 to 30 feet bgs to evaluate the vertical extent of the dissolved-phase impacts to groundwater. D-14 will be constructed to minimize the risk of cross contamination between the aquifers.

Groundwater sampling of new and existing monitoring wells, including monitoring well RMW-1 located on the Rainier Plywood property, north of the former bulk terminal property.

Proposed soil boring locations are subject to change based on the location of existing utilities, access restrictions or City of Tacoma permit requirements, worker safety, or other conditions encountered in the field. Offsite borings OB-6 through OB-12 will require an access agreement between Chevron and BNSF. All investigations activities will follow the May 25, 2010 *Remedial Investigation Sampling and Analysis Plan*.

Additional boring locations and potential “step out” borings may be required to fully delineate potential petroleum hydrocarbon impacts. Specifically, additional or replacement locations may be selected in the field based on the results of utility clearances subject to the limitations of access agreements. “Step out” borings may be proposed in the field on-site based on field screening however, our experience is that the most productive “step out” borings off-site are best sited based on laboratory analysis of the samples. If laboratory analysis indicates exceedances of MTCA cleanup levels, particularly in off-site samples, then additional borings will be proposed in a short memo to Ecology. In all cases, location and execution of boreholes off-site, whether as replacement or “step out” borings, will be subject to the limitations of the access agreements.

## **PERMITS AND SUBSURFACE UTILITY LOCATION SURVEY**

Prior to field activities, Leidos will obtain all appropriate access agreements and street-use permits. In addition, Leidos will contact the Utilities Underground Location Center to request that all public utilities be marked in the vicinity of the Site. Leidos will subcontract a private utility locating subcontractor to locate any other potential utilities or other subsurface infrastructure that may be present in the vicinity of the boring locations. Ground penetrating radar (GPR) and sewer/drain scoping will be performed to locate nonconductive utilities in the area, as necessary.

## **HEALTH AND SAFETY PLAN**

Per WAC 173-340-350(7)(c)(iv), as well as Leidos and CEMC policies and requirements a site specific health and safety plan (HASP) will be developed for this phase of work. The purpose of this HASP will be to meet or exceed the requirements of 29 CFR1910.120 and 29 CFR1926.65 and:

- To convey health and safety information to all parties engaged in the execution of the project;
- To ensure all activities are planned and controlled effectively and efficiently;
- Identify the health and safety hazards and risks and assure that the appropriate protective measures have been identified;
- Ensure workers, visitors and onsite personal review, understand and follow the requirements of the site specific HASP; and
- Ensure that HAZCOM requirements, where they apply for specific job sites, are referenced in the HASP or attachments.

An electronic copy of the site HASP will be provided to Ecology for review prior to the commencement of field work.

## **SOIL BORINGS AND SAMPLING**

Drilling and monitoring well installation activities will be performed by a drilling subcontractor licensed to operate in Washington State. Each monitoring well will initially be advanced to at least eight feet below ground surface (bgs) using an air-excavation rig or a stainless steel hand auger, in order to verify that no subsurface utilities are present. Below eight feet, borings will be advanced using a Geoprobe.

During drilling activities, a Leidos representative will be present to log soils and collect soil samples for field-screening and possible laboratory analysis. Soil sampling in the upper 8 feet of the boring will be performed using a split-spoon stainless steel hand auger at a sampling interval of approximately 1 foot. Below 8 feet, the Geoprobe rig will collect soil samples continuously until the final depth.

The approach to sampling the boreholes will vary with depth. As subsurface conditions allow, a split spoon stainless steel hand auger will collect relatively undisturbed soil samples at intervals of ~1 foot in the upper 8 feet of the boring. Below 8 feet, the Geoprobe rig will collect soil samples continuously until the final depth. All samples will be classified in accordance with the Unified Soil Classification System and field screened for the presence of petroleum hydrocarbons by headspace vapor measurements using a photo-ionization detector (PID) and sheen testing,

At a minimum, two soil samples from each boring will be submitted for laboratory analysis: one from the capillary fringe, and the second from the bottom-most sample interval attained in the boring. The bottom-most sample will be used to demonstrate that the sampling effort has advanced to a sufficient depth to define the vertical extent of

petroleum-hydrocarbon impacts. Additional soil samples may also be submitted based on field-screening observations such as but not limited to: the highest PID reading, strongest sheen, and the greatest visual or olfactory indication petroleum hydrocarbons.

The contaminants of concern for soil are based on the historical storage records as well as the results of the soil samples collected on and off site since the beginning of the investigation compared to MTCA Table 830.1.

Selected soil samples will be submitted to Eurofins Lancaster Laboratories Environmental, LLC (Lancaster Laboratories) for the following analyses:

- Gasoline-range organics (GRO) by ECY 97-602 NWTPH-Gx;
- Diesel-range organics (DRO) and heavy oil-range organics (HRO) by ECY 97-602 NWTPH-Dx;
- Benzene, toluene, ethylbenzene, and total xylenes (BTEX) by SW-846 8260;
- cPAHs by USEPA 8270; and
- Moisture by SM 2540 G-1997.

Duplicate soil samples will also be collected at a rate of one per each 20 soil samples and submitted for the above-reference analyses to ensure quality assurance and quality control (QA/QC).

Additional QA/QC samples will include one trip blank to accompany each sample cooler containing water samples and equipment rinse samples to verify equipment decontamination procedures. Equipment rinse sampling will be performed by collecting laboratory-supplied distilled water that has been used as the final rinse following equipment decontamination procedures. Equipment rinse samples will be collected at a rate of one per sampling activity. Trip blank and equipment rinse QA/QC samples will be submitted for the following analyses:

- GRO by ECY 97-602 NWTPH-Gx; and
- BTEX by SW-846 8260B.

Analytical data will be uploaded to the Ecology Environmental Information System (EIM) within 60 days after receipt of the validated laboratory reports.

### **MONITORING WELL INSTALLATION**

Each monitoring well will be cleared and sampled as a soil boring. Following completion of soil sampling activities, each boring will be completed as a 2-inch diameter monitoring well. Based on historical groundwater elevation data and construction details of previously existing monitoring wells, it is anticipated that deep monitoring wells (with the exception of D-14) will be installed to a depth of approximately 20 feet bgs, with a screened interval from 15 to 20 feet. Shallow monitoring wells will be installed at a depth of approximately 8 with a screened interval of 3 to 8 feet. Monitoring well D-14 will be completed to a depth of approximately 35 feet with a screened interval of 30 to 35 feet. Final well construction details will be

determined based on actual conditions encountered in the field. Wells will be constructed using pre-packed Schedule 40 poly-vinyl chloride casing and 0.010-inch factory slotted screen with 2/12 sand filter pack. Each monitoring well will be completed at the ground surface with a flush-mounted, traffic-rated well-box.

Each well will be developed after a minimum 24 hours after completion. Well development will consist of surging for 10 minutes and pumping at least 10 well casing volumes of groundwater from the well using an electric submersible-pump, until water produced is clear and free of sediment.

### **MONITORING WELL LOCATION AND ELEVATION SURVEY**

Following completion of the monitoring well installation a Washington State licensed land- surveying firm will be subcontracted to perform a location and elevation survey of the new monitoring wells. Monitoring well elevation measurements will be made to the nearest 0.01 foot at the ground surface (top of well-box lid) and at the top of the well casing relative to 1988 North American Vertical Datum (NAVD88).

### **INDIRECT GROUNDWATER-SURFACE WATER INTERFACE (GSI)**

Ecology has expressed a concern that the shallow groundwater plume may be intersecting underground infrastructure that could provide a preferential pathway for contamination. The storm sewer line in East J Street has an inside elevation of 0.56 ft. The surface elevation of MW-10 (located in East J Street) was recently surveyed to be 13.76 ft.

Groundwater elevations at MW-10 are approximately 6.9 ft. therefore the utility line is situated below groundwater at a depth of approximately 13 ft. bgs in a sandy/silty native soil. The depth of the utility and the depth to groundwater makes airknifing not feasible and at this depth the closest that a boring can be placed to the backfill is the location of MW-24 and D-9.

To assess the potential for impacted soil leaking into the storm sewer Leidos will work with the City to obtain access to three manholes along East J Street. These manholes are located at the intersection of East J and East F street, near MW-26 and near MW-10. These water samples will be analyzed for GRO by ECY 97-602 NWTPH-Gx, DRO and HRO by ECY 97-602 NWTPH-Dx extended and BTEX by SW-846 8260B.

### **GROUNDWATER MONITORING**

Following the completion of well installation and development activities, the new monitoring wells will be added to the quarterly groundwater monitoring program for the Site. Monitoring well RMW-1, located on the Rainier Plywood property, will also be added to the groundwater monitoring program, following completion of an updated access agreement. Groundwater monitoring will continue to be performed on a quarterly basis and will consist of water level measurements and sample collection at each monitoring well. Groundwater samples will be collected from each monitoring well using low-flow purging and sampling techniques.

The contaminants of concern for soil are based on the historical storage records as well as the results of the soil samples collected on and off site since the beginning of the investigation compared to MTCA Table 830.1.

Samples will be submitted to Lancaster Laboratories for the following analyses:

- GRO by ECY 97-602 NWTPH-Gx;
- DRO and HRO by ECY 97-602 NWTPH-Dx extended;
- BTEX by SW-846 8260B;
- MTBE by SW-846 8260B; and
- Total lead

QA/QC sample collection during groundwater sampling activities will include one trip blank to accompany each sample cooler and a field duplicate sample collected at a rate of one for each 20 samples.

All QA/QC samples will be submitted for the following analyses:

- GRO by ECY 97-602 NWTPH-Gx; and
- BTEX by SW-846 8260B.

In addition to the above analyses, field duplicate samples will also be analyzed for DRO and HRO by ECY 97-602 NWTPH-Dx.

Based on MTCA Table 830.1 and historic data, groundwater samples will not be analyzed for the following constituents:

- cPAHs - PAH samples were collected during in 2010 with all sample concentrations less than MTCA Method A cleanup levels.
- n-hexane: n-hexane is not included in the groundwater analyses per Table 830.1 footnote 9. No VPH or EPH will be run on groundwater therefore n-hexane is not required.
- EDB, EDC: Groundwater samples were collected in 2010 resulting in non-detects for 1,2-Dibromoethane and 1,2-Dichloroethane.
- Naphthalene sampling is not required for MTCA Method A cleanup levels based on footnote 14 of MTCA Table 830.1. That being said samples collected in 2010 were analyzed for naphthalene and resulted in non-detects in all wells.

Analytical data will be uploaded to the Ecology Environmental Information System (EIM) within 60 days after receipt of the validated laboratory reports.



## **CULTURAL RESOURCE MONITORING**

The site is primarily constructed on previously filled tidelands and the project team does not anticipate any cultural resources to be discovered during soil boring activities. However in the event of an inadvertent discovery of a potential cultural resource the communication plan of confirmed or suspected cultural resources is outlined as follows:

1. Upon discovery of a potential cultural resource, stop work authority will immediately be invoked.
2. The discovery of the potential resource will be communicated to the field manager onsite by member or members of the project team and item(s) found will be reviewed by an archaeologist to verify that the item is a potential cultural resource.
3. Regardless of whether the object is verified to be a cultural resource, at a minimum, the stop work will be reported to the project manager within one hour.
4. If the item is determined to be a potential cultural resource the notifications will proceed using the CEMC Incident Reporting and Investigation Procedures.
5. Following the notifications of CEMC and Leidos, the project manager will report the findings to the Ecology PM, the DAHP and the local tribe.
6. Work may not restart until all notifications are complete and the CEMC project manager grant permission.

## **INVESTIGATION-DERIVED WASTE MANAGEMENT**

Regulated investigation-derived waste (IDW) is anticipated to include soil cuttings and water, which will be generated during drilling activities, equipment decontamination, and well development. All regulated IDW will be containerized in 55-gallon, United States Department of Transportation-approved drums. Drums containing regulated IDW will be staged on site, at a location that is acceptable to the property owner, until a waste disposal profile can be generated and off-site transportation and disposal can be arranged (typically 6 to 8 weeks).

Non-regulated IDW, such as nitrile gloves, plastic sheeting, and nylon tubing used for well purging, will be disposed of as standard municipal waste.

## SCHEDULE

Off-site borings OB-1 through OB-5 and monitoring wells MW-23, MW-24, MW-26, D-8 and D-9 will require access from the City of Tacoma. Borings OB-6 through OB-12 and monitoring wells MW-27, MW-28 and D-11 will require access with BNSF Railroad. Monitoring wells MW-25 and D-10 will require access from Steeler Inc. Monitoring wells MW-29, D-12 and D-15 will require an access agreement with Rainer Plywood property owner. The timing of these access agreements will affect the project schedule. Leidos and Chevron will begin access agreement negotiations following approval of this work plan. It is anticipated that field work will begin within 90 days of approval of the work plan, and may be phased pending access negotiations, weather, or other unforeseen issues. The project team will request an extension if the 90 day window cannot be achieved.

Thank you for reviewing this work plan. Please direct any questions or comments to Don Wyll (Leidos Principal Project Manager) at 425-482-3315 or [wylld@leidos.com](mailto:wylld@leidos.com).

Sincerely,

**Leidos. Inc.**



Don Wyll  
Principal Project Manager

Enclosures:

Figure 1. Shallow Wells – Low Tide Potentiometric Map

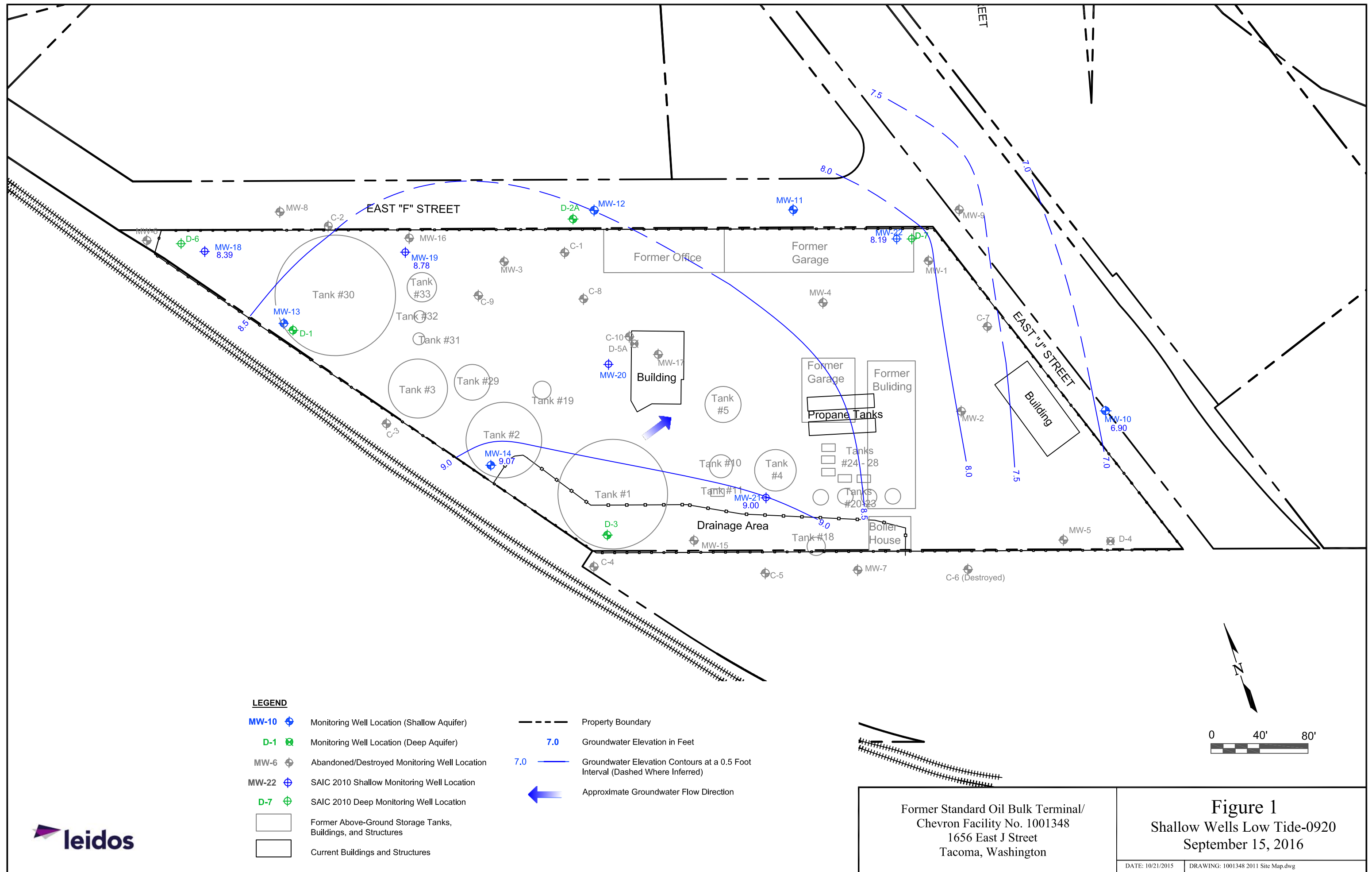
Figure 2. Shallow Wells – High Tide Potentiometric Map

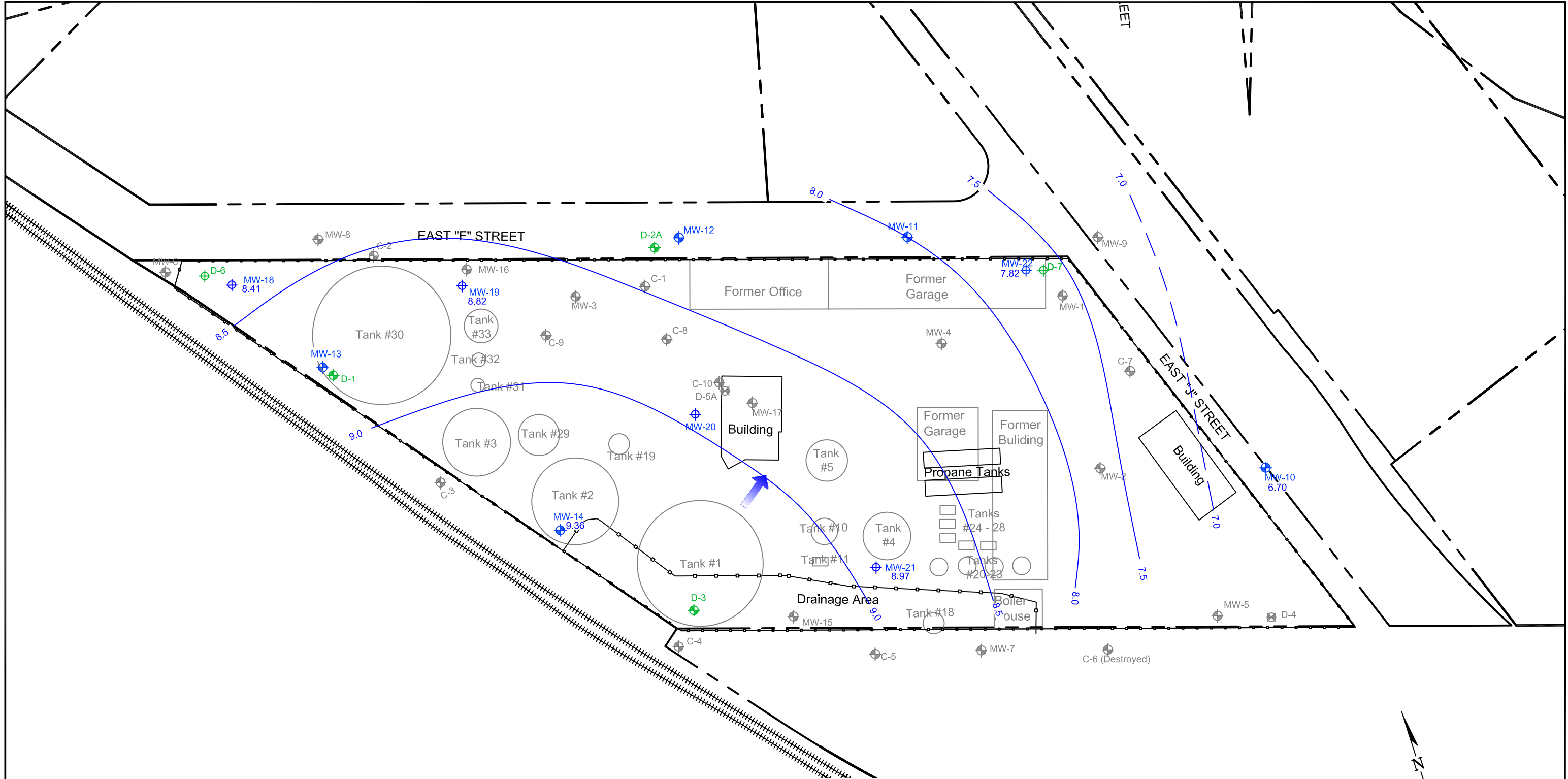
Figure 3. Deep Wells – Low Tide Potentiometric Map

Figure 4. Deep Wells – High Tide Potentiometric Map

Figure 5. Proposed Soil Boring Locations

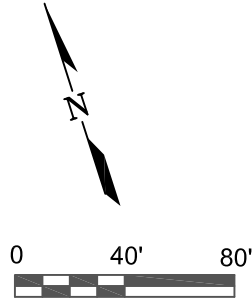
Figure 6. Proposed Monitoring Well Locations



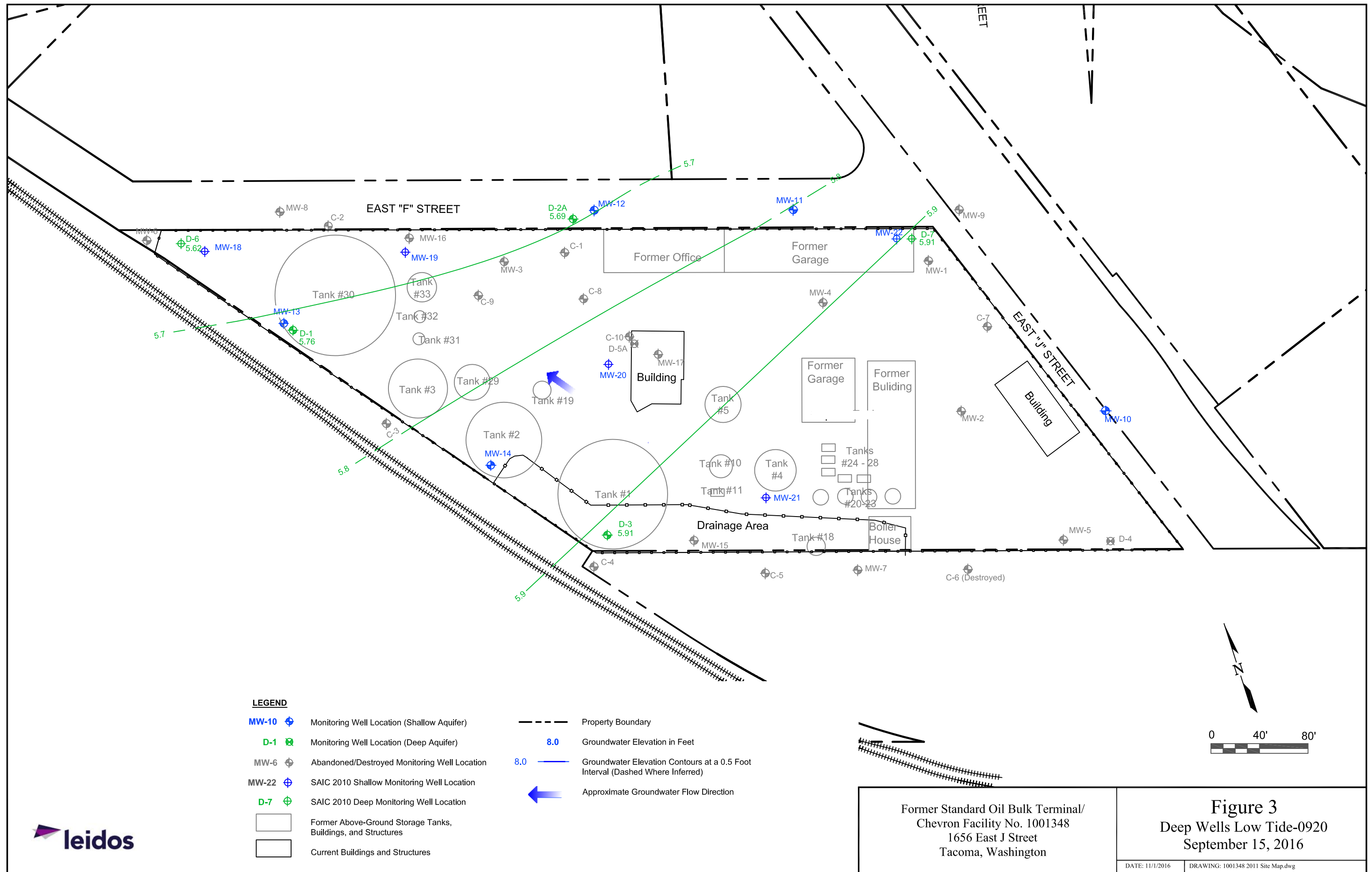


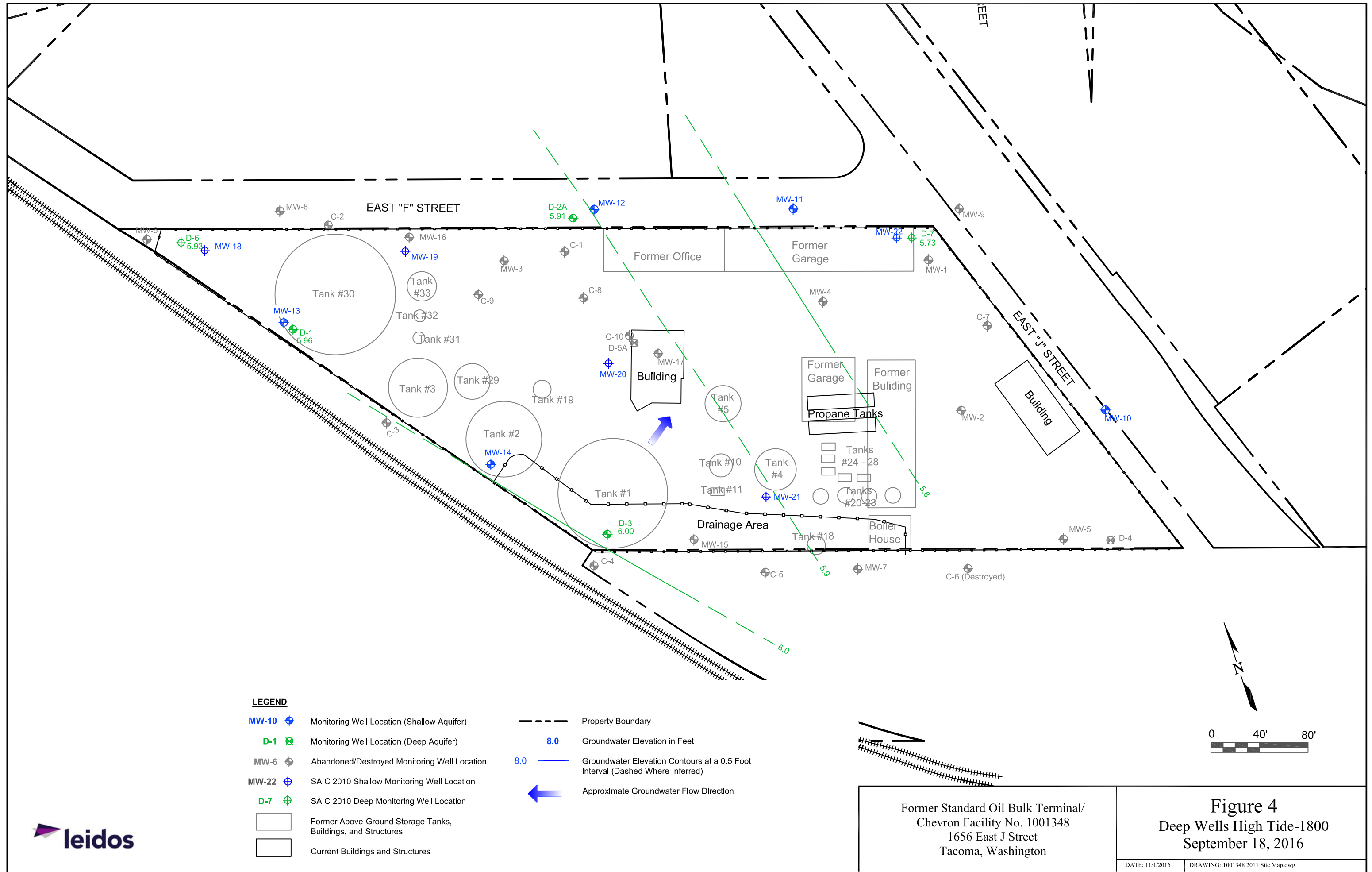
**LEGEND**

- |              |  |            |   |
|--------------|--|------------|---|
| <b>MW-10</b> | Monitoring Well Location (Shallow Aquifer)                   |            | Property Boundary   |
| <b>D-1</b>   | Monitoring Well Location (Deep Aquifer)                      | <b>8.0</b> | Groundwater Elevation in Feet   |
| <b>MW-6</b>  | Abandoned/Destroyed Monitoring Well Location                 | <b>8.0</b> | Groundwater Elevation Contours at a 0.5 Foot Interval (Dashed Where Inferred) |
| <b>MW-22</b> | SAIC 2010 Shallow Monitoring Well Location                   |            | Approximate Groundwater Flow Direction  |
| <b>D-7</b>   | SAIC 2010 Deep Monitoring Well Location                      |            |   |
|              | Former Above-Ground Storage Tanks, Buildings, and Structures |            |   |
|              | Current Buildings and Structures                             |            |   |



Former Standard Oil Bulk Terminal/ Chevron Facility No. 1001348 1656 East J Street Tacoma, Washington	<b>Figure 2</b> Shallow Wells High Tide-1800 September 18, 2016
	DATE: 10/21/2015   DRAWING: 1001348 2011 Site Map.dwg



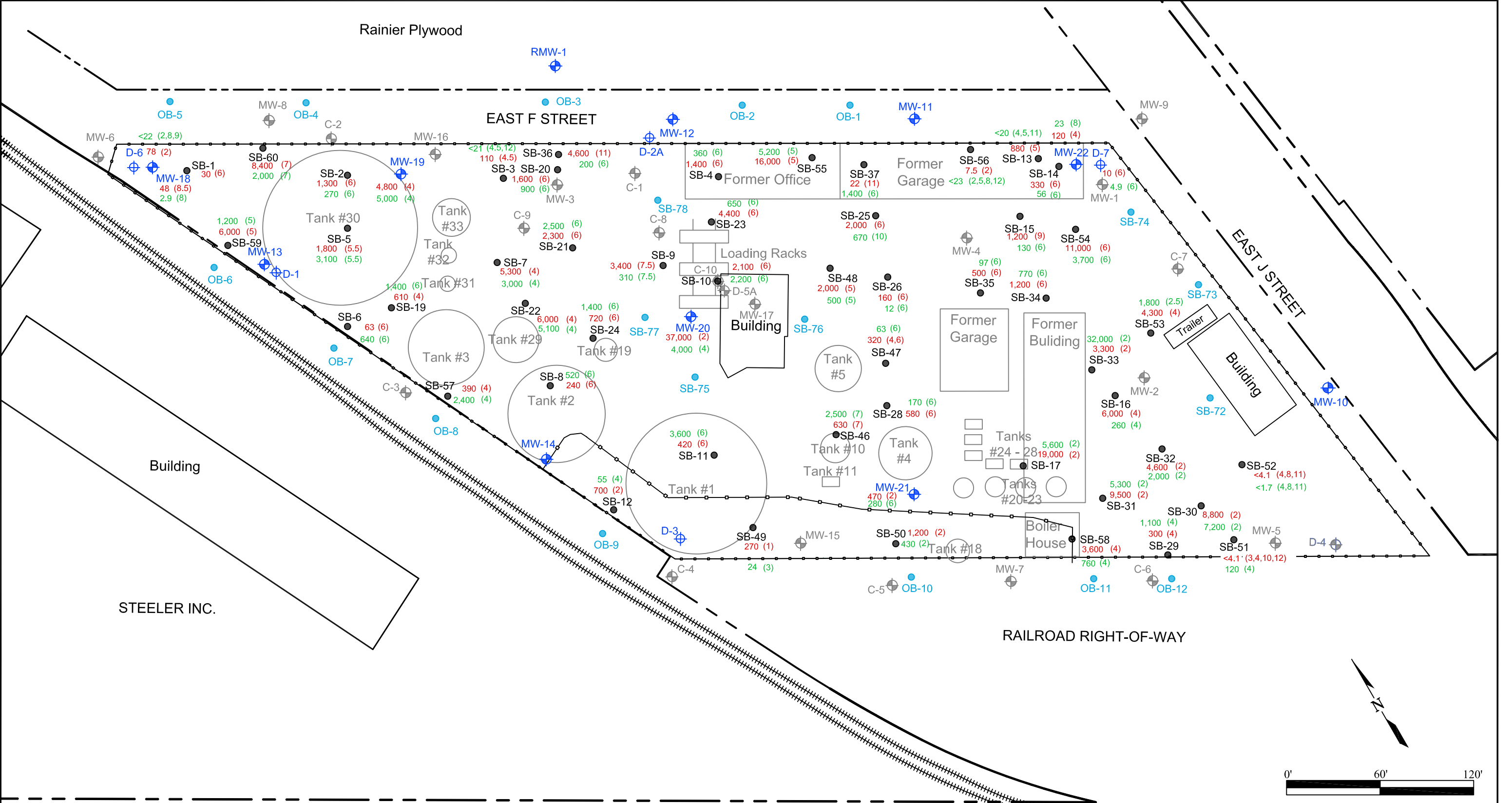


Former Standard Oil Bulk Terminal/  
Chevron Facility No. 1001348  
1656 East J Street  
Tacoma, Washington

**Figure 4**  
Deep Wells High Tide-1800  
September 18, 2016

DATE: 11/1/2016 | DRAWING: 1001348 2011 Site Map.dwg





**LEGEND**

**MW-10** Monitoring Well Location (Shallow Well)

**D-1** Monitoring Well Location (Deep Well)

**MW-6** Abandoned/Destroyed Monitoring Well Location

**SB-1** Completed Soil Boring Locations

Former Above-Ground Storage Tanks, Buildings, and Structures

Current Buildings and Structures

Property Boundary

**2,400 (4)** Gasoline-Range Hydrocarbon Concentrations in mg/kg and Sample Depth in Feet Below Ground Surface

**2,300 (6)** Diesel-Range Hydrocarbon Concentrations in mg/kg and Sample Depth in Feet Below Ground Surface

Approximate Locations for Proposed Soil Boring

Former Standard Oil Bulk Terminal/  
Chevron Facility No. 1001348  
1656 East J Street  
Tacoma, Washington

**Figure 5**  
Proposed Soil Boring Locations

DATE: 3/25/2016      DRAWING: 1001348 Tacoma Site Figures.dwg

